Response to FCC Request for Comments GN Docket No. 12-91

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NQ5L
April 10, 2012

1. **Importance of emergency Amateur Radio Service communications.**
    a. *What are examples of disasters, severe weather, and other threats to life and property in which the Amateur Radio Service provided communications services that were important to emergency response or disaster relief? Provide examples of the important benefits of these services.*

    Within the recent past there have been several notable instances where Amateur Radio provided communications support both locally and regionally where I have some personal knowledge. There have been many others as well.

    Jarrell Tornado. May 1997. As part of the storm system that leveled Jarrell, the Williamson County Sheriff's trunking radio system was taken off line. Local Amateur Radio operators were vital in providing immediate mobile communications into the stricken area while the system was brought back on line. This was done using the local VHF/UHF repeater infrastructure.

    Columbia Shuttle Disaster. February 2003. The area in east Texas where the bulk of the shuttle debris went down is heavily covered with pine forest. Cell phone coverage and coverage from normal radio systems was spotty to non-existent in the region. Amateur Radio provided spot communications as the recovery teams walked the terrain finding and marking bits of debris. Operators from all over Texas and the surrounding states were involved.

    Hurricane Rita. September 2005. Rita stalled for over 24 hours over east Texas with the resulting devastation of homes, trees, and most importantly extensive destruction to the power grid in the area. I personally visited the area around Jasper, Texas on 3 different occasions for that event, the longest deployment being 6 days in the area. For that event we used VHF for local communications and HF for longer haul. HF digital (PacTOR) was extremely valuable in both the management of the Amateur Radio response as well as in ordering food for some 15-20,000 meals per day being prepared by the Baptist Men's Kitchen and delivered by the Salvation Army.

    Williamson County Flood. September 2010. With local rainfall exceeding 12 inches in less than 24 hours, Amateur Radio was deployed with the County Emergency Management organization and provided local situation awareness. Regular communications systems remained working, but the weather condition reports from many more "feet on the ground" aided County officials in tracking conditions across the county.

    The importance of the Amateur Radio communications services is primarily the resiliency of "hams". In both the Jarrell and Rita events, local communications infrastructure was significantly damaged and unusable. Amateur Radio provided a quick response secondary system, including both equipment and experienced operators, to provide communications while regular systems were brought back on line

    In the shuttle disaster, there was no local communications system with adequate

coverage and capacity to support the large number of responders who came to the scene. Again, Amateur Radio could provide personnel, equipment, and bandwidth to sustain communications under difficult conditions.

In the last case, Amateur Radio was able to provide additional personnel, along with their own equipment and infrastructure to augment regular emergency responders so they could focus on the most important tasks and still maintain a high level of situational awareness.

b. *Under what circumstances does the Amateur Radio Service provide advantages over other communications systems in supporting emergency response or disaster relief activities? Under what circumstances does the Amateur Radio Service complement other forms of communications systems for emergency response or disaster relief?*

The principal advantage of the Amateur Radio Service over other systems is its resiliency and adaptability. In most situations, existing communications systems used by regular emergency responders are entirely adequate to their needs. In those cases, Amateur Radio may only exist to complement those systems and personnel with additional resources.

However, if those systems fail, or if they become overloaded with traffic, the Amateur Radio system can provide an alternative communication means. Given the cost and complexity of many modern systems, Amateur Radio provides a remarkedly simpler and, to a large extent, more reliable system due to its sheer numbers of independent communications resources. Since Amateur operators tend to be much more technically involved with their equipment than typical emergency responders, they are able to re-configure systems on the fly and are creative in developing work around solutions to problems.

Another significant benefit of an Amateur Service response in an emergency is the handling of health and welfare communications. One of the choke points following an event is the intense desire for people outside the area to know their loved ones are safe. This can lead to an overload on the existing system and a drain on critical emergency response resources to deal with the questions even though it is a low priority. In that case, the Amateur Service has a long tradition of taking over that role and getting messages out of a stricken area for residents so that others can know their status.

e. *. . . . In addition, are there any specific changes that could be made to the technical and operational rules for the Amateur Radio Service (Part 97, Subparts B, C, and D) that would enhance the ability of amateur operators to support emergency and disaster response? What other steps could be taken to enhance the voluntary deployment and effectiveness of Amateur Radio Service operators during disasters and emergencies?*

In Subpart B, Section 97.113(a)(3)(i), the restriction on drills and other emergency preparedness activities on the part of an employer is an operational rule that impedes the ability of many Amateur Service operators to adequately participate in training events.

One of the axioms that applies is “as you train, so will you operate.” In today’s environment many of the emergency responders who are employed by both government and non-government organizations are also Amateur Operators. In my

interactions with many local and state level organizations I have found many of them are also Amateur Operators.

The rule as currently written makes a distinction between government and non-government sponsored drills. The NIMS model which is becoming universally adopted states that non-government organizations are just as relevant as government organizations. Yet the FCC rules penalize non-government organizations and restrict their ability to conduct effective training.

Clearly it is not in the best interest of the Amateur Service to relax the position on using the Service for the pecuniary advancement of the employer, but neither is it productive to remove paid employees from participating in non-government drills where they can develop and hone skills needed during an actual emergency event.

As a specific example, in the Central Texas area (Austin and surrounding areas) most of the hospitals have installed Amateur Service equipment to provide both voice and data capability. These systems are exercised monthly in a formal drill conducted by the local Amateur Radio Emergency Service. The drill typically lasts longer than 1hour, but employees of the hospital who are also Amateur Operators are precluded from effectively participating under 97.113 since it is not government sponsored and lasts more than 1 hour . There is no pecuniary interest for the hospitals in the drill, but it limits the participation of operators who may already be at the hospital in the event of a real emergency.

In Subpart B, Section 97.113(a)(4), there is a stipulation prohibiting “messages encoded for the purpose of obscuring their meaning, except as otherwise provided herein”. This effectively limits the use of the Amateur Service if encryption is required by the agency using the Service as a backup or augmentation of existing pathways. The use of PGP, NSA, and FED STD AES encryption is widespread and perhaps legally required (HIPAA, for example). Normal, non-Amateur Service communications systems do not have this restriction. Lacking this ability limits our effectiveness in many cases.

One could perhaps argue that, during a real emergency where life or property were at stake, the encrypting rule could be over looked. However, that would preclude training with the equipment, software, and proper procedures with the result that the Amateur operator would be trying to learn all of that while engaged in an actual emergency event. That is not a formula for success. The ability to train is vital to being able to perform properly when the chips are down.

The regulations already make exceptions to this requirement in 97.211 for space telecommand applications, in 97.215 for control of model aircraft, and in 97.217 for telemetry applications.

It is useful to consider the Australian approach to this limitation. They have similar exemptions from the requirement for space stations and for control of an unattended amateur station. In addition, they have inserted a specific exemption for “intercommuncations when participating in emergency services operations or related training exercises.”

A similar exemption for emergency use and training would open up an expanded range of Amateur Service support in emergency response situations. It is essential that the training element be considered since, without being able to train on the use of the

necessary protocols and equipment, it is likely that it's use in a real emergency would be significantly compromised.

There is a similar restriction also in Subpart D, Section 97.309(b) where the regulation says "RTTY and data emissions using unspecified digital codes must not be transmitted for the purpose of obscuring the meaning of any communications." This language would also need to modified.

In Subpart C, Section 97.221 the restrictions are draconian in their nature. First, the tiny slivers of spectrum allocated for automatic stations would be totally overwhelmed with any large emergency where the Amateur Service were expected to provide any significant digital response. Depending on the band, there is only a region from 5 to 15 KHz wide below the 10M band. Further, in the other segments of the band under semi-automatic control (i.e., where a connection is initiated manually with an automatic response from the receiving station) the automatic station is restricted to a bandwidth of 500 Hz.

Modern HF modulation techniques can squeeze fairly high data rates into the same bandwidth as a single sideband voice signal (2.6 KHz.) There doesn't seem to be any pragmatic justification for the 500 Hz restriction, except to slow the data rate.

While there could be some philosophical (or emotional) reason for the restriction on fully automatic operation, there is no practical reason to restrict the use of semi-automatic operation where there is an operator on one end of the link controlling the activity beyond good engineering practice in keeping with similar bandwidth restrictions for other allowed modes and modulation techniques.

In Subpart D, Section 97.305 data and phone emissions are separated into different sub-bands in the HF allocations. This means that stations wishing to exchange data and also manage that process by voice must either have two separate stations capable of both operating in the same band, or the operators have to jump back and forth between a data frequency and a voice frequency.

Particularly if an RF only path (i.e., without the use of the Internet) is needed this makes the interchange extremely difficult to manage. In local applications we are able to use two different frequencies to do this because many if not most amateur radios can support this type of operation. It is very effective to use voice on a repeater to manage the data flow on separate frequencies.

A similar process is used by Army MARS where their frequency allocations allow voice and data operation on a common frequency. This makes for a very clean operational net with the operators able to manage issues with a data connection and verify reception as soon as the digital message is complete. It is a much more effective procedure than anything available on the Amateur HF bands.

As a proposal, perhaps it would make sense to restrict data to a relatively narrow bandwidth in the RTTY portion of the HF bands and allow digital modes in the phone portion that had bandwidths no greater than that needed for a voice channel (3 KHz).

In Subpart D, Section 97.307(f)(3) there is a restriction on the symbol rate at 300 bauds. This is an antiquated restriction based on the assumption that baud rate and bandwidth are tied together. This has not been the case for years. Modern modulation techniques can provide much higher symbol rates in bandwidths similar to those required by a

normal voice signal.

One of the many attractive features that the Amateur Service now offers to served agencies is the ability to send email (including digital attachments) over radio. This can serve as a link if there is a widespread but local or regional Internet outage due to a natural or manmade event. This is viewed as a critical idea by many served agencies. With the right planning and training, this can be extended to significant operational effectiveness over broad areas without any use of the Internet. There is a multi-state exercise in the planning stage right now to do an "RF Only" emergency drill covering 6 states and based on a largely digital format on HF radio with local linkages on VHF/UHF packet radio.

The current technical art is that the latest version of PacTOR (Pactor IV) can achieve data rates approaching 10,000 bps in a 2400 Hz bandwidth with signal rates of 1800 baud. This is up to 3 times faster than Pactor III in the same bandwidth, but is not allowed in the Amateur Service in the United States due to the 300 baud limitation. The STANAG standard followed in the US and other Federal Standards are also restricted from use in the Amateur Service due to similar issues with baud rates even though they are in widespread use in the US and abroad. Pactor IV is a German development and is being adopted on a worldwide basis in the Amateur Service and in the US in various MARS organizations.

In particular the restrictions on the HF bands should be removed with only a suitable bandwidth limitation. The higher frequency bands should receive similar changes with bandwidths appropriate to the band being considered.

There are also practical considerations when this is considered from the manufacturer's view. If the Amateur Service cannot use more modern technology there is no reason to develop commercial equipment to support the Service. From an experimenter's view, there is no reason to experiment and innovate new modulation techniques if they cannot be used on the air.

Overall, the simplest approach would be to simply adopt bandwidth policies for all of these types of issues and allow any and all technical approaches that satisfies the bandwidth limitation. This would aid in providing additional innovation in communications, which is one of the reasons the Amateur Service exists, and provide more robust and capable systems to offer to emergency operations, which is another reason the Amateur Service exists.

2. Impediments to enhanced Amateur Radio Service communications.

a. What private land use restrictions on residential antenna installations have amateur radio operators encountered? What information is available regarding the prevalence of such restrictions? What are the effects of unreasonable and unnecessary restrictions on the amateur radio community's ability to use the Amateur Radio Service? Specifically, do these restrictions affect the amateur radio community's ability to respond to disasters, severe weather, and other threats to lives and property in the United States? What actions can be taken to minimize the effects of these restrictions?

Most real estate developments have land use restrictions written into the deed, particularly ones that have been developed in the last 30 years. In many cases, antennas are simply not allowed. In this area (central Texas), at least, there are few

housing areas in towns or cities that do not have restrictions essentially curtailing the installation of HF antennas and limiting the effectiveness of antennas for higher frequencies. The exceptions are older areas which typically have fewer homes available, or rural areas somewhat remote from the centers of activity where most people prefer to live.

In addition to antenna restrictions, there are also restrictions in some developments against the installation of internal combustion powered generators to provide and alternative power source. These same types of restrictions are applied to solar panels and wind turbines. Some restrictions even go so far as to preclude the flying of the American flag.

These restrictions are often justified on the basis of "protecting property values." However, the tax appraiser for Harris County (Houston) testified before the Texas legislature that amateur radio antennas had no effect on real estate values.

The net effect is to significantly reduce the effectiveness of Federally licensed operators by preventing them from operating on the HF bands, or, at the least, reducing their effectiveness when forced to operate with compromised "stealth" installations.

One plausible action at the Federal level is to extend the effect of PRB-1 to cover private land restrictions as well. In limited cases, local action has been successful in getting restrictions relaxed to accommodate some form of outside HF antenna installation. In other cases, Home Owners Associations (HOAs) have refused to bend their objections.

Resolution this matter at the Federal level is problematic since it involves extending the Federal Government's intrusion into private contract matters even further. Up until now the FCC has properly refused to do so. In my opinion, these issues, while significant as an impediment, are better settled at the local or state level without increasing interference from the Federal government in private matters.

b. *What steps can amateur radio operators take to minimize the risk that an antenna installation will encounter unreasonable or unnecessary private land use restrictions? For example, what obstacles exist to using a transmitter at a location not subject to such restrictions, or placing an antenna on a structure used by commercial mobile radio service providers or government entities?*

The first step is to fully understand any land use restrictions prior to acquiring the land. Given the near universality of such restrictions, and that these restrictions are "cookie cutter" documents with little thought about the implications, this is extremely difficult when looking for a home with conflicting desires for convenience to schools, work, and shopping and the desire to participate in the Amateur Service.

Depending on the situation, if it is early in the life of a development, it may be possible to get the rules changed or an exemption written into the contract. Otherwise, it is a local political process within the HOA that governs matters to convince them to allow an exemption or change the rules. These are usually difficult, time consuming activities at best.

There are few amateurs who can afford to fund alternate transmitter sites in addition to their residence so this isn't usually practical. Placing an antenna on a commercial or government structure is often economically not feasible. Even if the owner is amenable to a "no cost" arrangement, insurance requirements often dictate that all work is done

by professional antenna installation companies using commercial installation practices. That can run the costs up into the thousands of dollars just to place an antenna, and each time any maintenance is requires.

a. *Do any Commission rules create impediments to enhanced Amateur Radio Service communications? What are the effects of these rules on the amateur radio community's ability to use the Amateur Radio Service? Do disaster and/or severe weather situations present any special circumstances wherein Commission rules may create impediments that would not otherwise exist in non-disaster situations? What actions can be taken to minimize the effects of these rules?*

Several rule modification requirements were discussed in response to question 1 above. In this writer's opinion, the rule changes suggested are more pressing and of more importance to effective Amateur Service emergency communications than the questions of antenna restrictions.

Since the axiom is to practice and train as we expect to operate in a real emergency, the same rules and regulations should apply to emergency drill situations as would apply in a real emergency with the exception of the "any means at your disposal rule" that applies in the event of immediate threat to life or property.

c. *Do any Commission rules create impediments to enhanced Amateur Radio Service communications? What are the effects of these rules on the amateur radio community's ability to use the Amateur Radio Service? Do disaster and/or severe weather situations present any special circumstances wherein Commission rules may create impediments that would not otherwise exist in non-disaster situations? What actions can be taken to minimize the effects of these rules?*

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d. *What other impediments to enhanced Amateur Radio Service communications have amateur radio operators encountered? What are the effects of these impediments on the amateur radio community's ability to use the Amateur Radio Service? Specifically, do these impediments affect the amateur radio community's ability to respond to disasters, severe weather, and other threats to lives and property in the United States? What actions can be taken to minimize the effect of these impediments?*

One of the issues at hand is the effective credentialing of Amateur Service operators with a mechanism that is recognized across state and Federal agencies and boundaries. Many emergency response groups (ARES and RACES as well as the military service MARS groups) have developed their own methods for credentialing their members but there is no Federal standard for how this is done. Since we can and do work with a multitude of government and non-government organizations, a single point of obtaining a widely accepted credential would reduce time spent on dealing with varied requirements and

allow for the efficient use of qualified Amateurs across geographic as well as organizational boundaries.

e. *The legislation requires the Commission to identify "impediments to enhanced Amateur Radio Service communications." What specific "enhance[ments]" to Amateur Radio Service communications have been obstructed by the impediments discussed above?*

The discussion above on the recommendations to the technical rules lists the greatest impediment to current operations in that they preclude the deployment of modern technology for digital communications due to antiquated rules. These same rules also are impediments to enhancing the Service.

If we can't deploy technology that is several years old in the Amateur Service and have severely restricted bandwidths for some activities such as automatic and semi-automatic operation that are already widely used in the Amateur Service outside the US and in other services inside the US, there is little incentive to experiment with new ideas.

The Amateur Service has a long tradition of technical innovation and public service through emergency communications support. Updating these rules to the minimum possible limitations would free up that creative spirit in the Amateur community to develop and deploy new technology that can expand the capabilities we offer for enhanced communications capabilities.